comparison, in the 'Mikrogeologie,' pl. 37. 10. fig. 1 *a–f*, under the name of *Borelis* (*Melonia*) *Melo*.

All the *Alveolinæ*, recent and fossil, that we have yet seen present but one specific characterization in their structure, however much their external form may vary in shape from round to cylindrical, or in size from the dimensions of a grain of sand to one or more inches in length. For nomenclatorial purposes the first-established specific appellation, accompanied by varietal names, will serve well — *Alveolina Melo*, varr. *sabulosa*, *elongata*, &c. For particulars as to its structure we refer the reader to Dr. Carpenter's Monograph on *Alveolina* in Phil. Trans. 1856.

XVIII.—*Notes on the Hydroid Zoophytes.* By Prof. ALLMAN.

1. *On the Locomotive Sexual Zooid of* Dicoryne conferta.

IN the 'Annals of Natural History' for November 1859 I described, under the name of *Dicoryne*, a new genus of Tubularidan Zoophytes, assigning to the species on which I founded the genus the name of *stricta*.

Since then, Mr. Alder has obtained perfect specimens of a zoophyte which in his valuable "Catalogue of the Zoophytes of Northumberland and Durham" he had previously described under the name of *Eudendrium confertum*, and has satisfied himself that my *Dicoryne stricta* is identical with the *Eudendrium confertum* of that work.

Having recently seen, in the possession of Dr. Strethill Wright, specimens of the *Eudendrium confertum* sent to him by Mr. Alder, I have no hesitation in assenting to Mr. Alder's view of the identity of the two animals—an identity which I did not before recognize in consequence of the original description and figure of *Eudendrium confertum* having been apparently given from imperfect specimens, as no notice is taken in them of the very characteristic proliferous polypes (*Gonoblastidia*, Huxley).

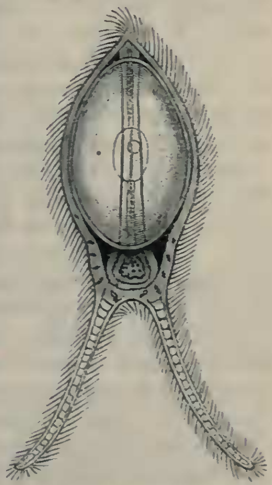
While, however, there can be no question as to the validity of the genus *Dicoryne*, the specific name of *stricta* which I gave to the zoophyte must be abandoned, and that of *conferta*, which had been assigned to it by Mr. Alder, its discoverer and original describer, retained.

When I published an account of this remarkable genus, I had seen only male specimens; since then, however, female individuals have fallen into my hands, and I have been enabled to make a more complete investigation of the structure of the gonophores and of the phenomena connected with the sexual reproduction of the zoophyte.

The gonophores of *Dicoryne* are, as I have already described (*loc. cit.*), borne upon peculiar polypes destitute of tentacula and mouth. They are of an oval shape, shortly pedunculated, and grouped in clusters of from about 10 to 20 or more in each. The male and female are similar in form. They consist of an external sac (ectotheca*), within which is a second sac (endotheca) containing the ova or spermatozoa, and with a long simple spadix occupying its axis. Immediately behind the endotheca, and between it and the ectotheca, two tentaculum-like processes are given off exactly opposite to one another; and these, continuing to lie between the two membranes, run forward for some distance towards the summit of the gonophore. No mesotheca is developed.

When the gonophore attains maturity, the ectotheca bursts, and the endothecal sac, separating itself from the peduncle just behind the two tentacular processes, escapes into the surrounding water, leaving the torn ectotheca attached to the summit of the peduncle.

The body thus set at liberty is a sexual zooid of an exceedingly singular kind, and, so far as we yet know, without any exact parallel. Immediately on acquiring its freedom it throws back its two tentacles, which had been previously turned forward as they lay impacted between the ectotheca and endotheca of the gonophore, and which now becoming extended to two or three times their former length, diverge from the posterior extremity of the liberated zooid. Its form is that of an oval, pointed at one end (anteriorly) and truncated at the other (posteriorly), so as somewhat to resemble the front view of a mitre, and with the two tentacles diverging from the truncated extremity. Anteriorly it consists of a spacious sac, which is occupied by the generative elements surrounding a long spadix which extends through the entire axis of the sac, impinging upon its summit and there remaining adherent to its walls; while posteriorly the zooid becomes more contracted, and into this part the sac does not extend. The whole body is covered with long cilia, which



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* For an explanation of the terminology employed in the present paper, I must refer to my "Note on the Structure and Terminology of the Reproductive System in the Corynidæ and Sertulariadæ," published in the 'Annals of Natural History' for July 1860.

extend even to the extremities of the two tentacles, and by whose aid the zooid swims actively in the surrounding water.

The endoderm of the tentacles presents very distinctly the septate condition so frequent in the tentacles of the Hydrozoa; and by carefully managed compression this peculiar structure can be plainly seen to be continuous with a similar one in the endoderm of the spadix, where, however, it is looser and less regular, and does not encroach upon the central cavity. The cavity of the spadix is lined with a thick glandular layer whose cells are filled with reddish-brown matter.

In the male zooids the spadix is surrounded by a continuous mass of spermatozoa; in the female, the place of the spermatozoa is occupied by ova, which are invariably two in number, and are placed one on each side of the spadix, and in such a position that only one is visible when the zooid is viewed in the plane of the two tentacles.

The spermatozoa are caudate corpuscles, the corpuscle having the form of a cone, with a broader base than is usual among the Hydrozoa.

The ova present a well-defined germinal vesicle, in which a germinal spot is visible or may be easily rendered so by slight compression. They are invested by a proper membrane, which is remarkably thick and richly studded with thread-cells—a character of which I am not aware of any other instance among the Hydrozoa.

The sac which contains the generative elements is simply the endotheca of the original gonophore; its walls contain abundance of thread-cells. The narrow posterior portion from which the tentacles spring represents the base of the manubrium, with the ectoderm and endoderm not separated from one another by the intervention of ova or spermatozoa.

The sexual zooid of *Dicoryne conferta* always swims with its body in a vertical position, carrying the posterior or tentacular extremity uppermost, and maintaining all the time a constant rotation on its longer or vertical axis.

If we now compare the sexual zooid of *Dicoryne conferta* with the medusoid of other species, we shall find that it corresponds exactly to an ordinary medusoid reduced to the manubrium, but having the place of the umbrella occupied by two tentacles. The tentacles themselves are, I believe, the representatives of the radiating canals of the medusoid. It will be recollected that they are turned forward while the zooid is still enveloped by the ectotheca; and it may also be borne in mind that in certain medusoids, as those, for example, of *Laomedea dichotoma*, the umbrella is frequently inverted and thrown back, so as to assume the position of the tentacula in the free zooid of *Di-*

coryne. In order, then, to convert this zooid into a medusoid, little more is necessary than to suppose the number of the tentacles increased to four by the symmetrical development of two others, their extremities connected by a circular canal, and their sides by a continuous muscular membrane (umbrella).

Besides medusoids and the body now described, the only other form of locomotive zooid with which I am acquainted among the Phytoidal Hydrozoa is one recently described by the Rev. T. Hincks (Ann. Nat. Hist. Feb. 1861, p. 74) as being produced by *Clavatella*, a Tubularidan zoophyte discovered by him on the south coast of England. Mr. Hincks has made *Clavatella* and its zooid the subject of a beautiful memoir, and has shown that the zooid is identical with the *Eleutheria* of De Quatrefages.

It will at once be seen that the sexual and locomotive zooid of *Dicoryne* is very different from that of *Clavatella*; for while the latter in its development and structure, as shown by Mr. Hincks, is closely related to a digestive polype, the zooid of *Dicoryne* has manifestly a nearer relation to a medusoid.

2. *Corymbogonium capillare*, Alder.

Mr. Alder, in his Catalogue, describes and figures a new zoophyte under the name of *Eudendrium capillare*. The description and figure there given are amply sufficient for all purposes of identification; but as the specimen from which the characters were drawn was preserved in spirit, it was impossible to render them as complete as if the author had been in possession of the living animal.

An opportunity has recently been afforded me of examining the zoophyte in a living state, having obtained it in small quantities in May last, while dredging in the Firth of Forth; and I have thus been enabled to supply some deficiencies which must necessarily exist in descriptions drawn up from spirit-specimens alone.

I have further been compelled to separate this zoophyte from the genus *Eudendrium*, in which it had been placed by Mr. Alder, and to construct for it a new one, for which I would propose the name of *Corymbogonium*, and which may be defined as follows:—

CORYMBOGONIUM, mihi.

Polypes with a single verticil of filiform tentacula. Gonophores (male)* in umbelliform clusters on the extremities of separate non-polypiferous branches; bilocular. Polypary investing the whole of the stems and branches of the cœnosarc.

Name.—From κόρυμβος, a cluster of berries; γόνος, offspring.

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* I have seen no female specimens; and Mr. Alder makes no mention of the sex of the specimen described by him.

C. capillare, Alder.

Zoophyte erect, rising to half or three-quarters of an inch in height from a creeping radicular tube; much and irregularly branched; branches of equal thickness with the main stems, capillary, ringed at their origin; branches which carry the gonophores short, lateral or else springing from the creeping basal tube. Polypes with about 24 or 26 tentacula. Gonophores pure white. Polypes light brown, becoming darker and more opake in the older parts.

The general character of the polypes, cœnosarc, and polypary of the present zoophyte is that of the genus *Eudendrium*. The remarkable umbelliform clusters, however, in which the gonophores are borne on the summits of non-polypiferous branches, afford a character whose importance cannot be neglected, and which renders it necessary to separate from that genus the subject of the present communication.

The whole zoophyte is very minute, and may in consequence be easily overlooked. The only specimens I obtained were attached to a piece of *Delesseria sanguinea* brought up in the dredge from a depth of about four fathoms. They adhered to the fronds of the Alga by a creeping, branched and anastomosing radicular tube.

The male gonophores (no specimens of the female having yet been seen by me) are supported each on a short peduncle.

The umbel-like clusters in which they are grouped have been fully noticed by Mr. Alder; they contain usually from ten to fifteen gonophores in each cluster. The ramuli on whose extremities they are borne are shorter than the fully-developed polypiferous ramuli, and arise further back than these, springing either from the principal branches or directly from the radicular tube.

The ramuli which thus carry the gonophores contain an extension of the cœnosarc, which becomes naked at their extremities and there enlarges into a common basis for the support of the cluster. This enlarged basis, though entirely destitute of mouth and tentacles, is manifestly the representative of a polype, and corresponds to the gonoblastidia of *Dicoryne*.

The structure of the gonophore is remarkable. Its peculiar moniliform shape has been noticed by Mr. Alder. At first this body is in the form of a spherical sac raised on a short peduncle. It contains a large simple spadix, which occupies the entire axis of the sac, and which soon becomes surrounded by the spermatogenous tissue. A small cellular mass next shows itself on the summit of the gonophore, and increases in size, while its interior becomes hollowed out into a cavity which communicates with that of the gonophore. Into this cavity the spadix gradually extends itself; while part of the spermatozoal contents of the original sac also pass into the newly-formed cavity. The superadded portion continues to increase in size, and soon acquires a form exactly resembling that of the original sac, so that each gonophore now presents a double sac, one superposed upon the summit of the other. Into this second sac the original one continues to discharge its contents, and gradually contracts as the terminal one enlarges. In the terminal sac the spermatozoa attain to their full maturity, and ultimately, in the shape of pyriform caudate corpuscles, escape from it by an aperture in its summit.

BIBLIOGRAPHICAL NOTICES.

British Wild Flowers. Illustrated by J. E. Sowerby. 8vo. London: Van Voorst, 1860.

A reissue of this useful book has been commenced by Mr. Van Voorst in monthly parts. The book consists of 80 coloured plates, containing figures of a portion of each of 1600 British flowering plants. These figures are very nicely executed, and are parts of the complete representation of the plant which is to be found in the well-known 'English Botany' or its Supplement. In most cases they amply fulfil the purpose for which they are intended. Being clear, and usually characteristic of the plants, they will be found convenient for removing temporary difficulties caused by want of memory or an imperfect knowledge of allied species. Such a book is sure to be useful, and seems to supply a want that has long been felt.

Certainly there are cases in which we should have made a slightly different selection from the original plate, or added an outline of some organ not there delineated: the judgment of the artist or his adviser differed considerably from ours in the estimation of what would be most useful to the student. But that is a very small fault; for it only renders the book a little less useful than it might have been.

We do not think much of the letterpress which accompanies the plates; and, indeed, its author claims very little credit for it. No person must attempt to use it as a descriptive flora. If the descriptions had been left out, much space would have been saved, and the value of the book not diminished. All the letterpress requisite is the name of the plant and a few references to descriptions by recognized authors.

We wish that all the plants of which figures have appeared in the 'Supplement to English Botany' had been inserted in these plates. Those contained in vol. iv. of the 'Supplement' seem to be omitted; and as they consist chiefly of the more recent discoveries, or what are called critical plants, their want will often be felt. Mr. Sowerby may perhaps have done well in giving figures of some plants included by mistake in 'English Botany,' in order that his 'Wild Flowers'